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Social, Cultural, and Behavioral Modeling

9th International Conference, SBP-BRiMS 2016
Washington, DC, USA, June 28 – July 1, 2016
Proceedings

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ISSN 0302-9743 ISSN 1611-3349 (electronic)
Lecture Notes in Computer Science
ISBN 978-3-319-39930-0 ISBN 978-3-319-39931-7 (eBook)
DOI 10.1007/978-3-319-39931-7

Library of Congress Control Number: 2016940349

LNCS Sublibrary: SL3 – Information Systems and Applications, incl. Internet/Web, and HCI

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Printed on acid-free paper

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The registered company is Springer International Publishing AG Switzerland

Preface

Improving the human condition requires understanding, forecasting, and impacting sociocultural behavior both in the digital and nondigital worlds. Increasing amounts of digital data, embedded sensors collecting human information, rapidly changing communication media, changes in legislation concerning digital rights and privacy, and the spread of 4G technology to developing countries are creating a new cyber-mediated world where the very precepts of why, when, and how people interact and make decisions are being called into question. For example, Uber took a deep understanding of human behavior vis-à-vis commuting, developed software to support this behavior, ended up saving human time (and thus capital) and reducing stress, and so indirectly created the opportunity for humans with more time and less stress to evolve new behaviors. Scientific and industrial pioneers in this area are relying on both social science and computer science to help make sense of and have an impact on this new frontier. To be successful a true merger of social science and computer science are needed. Solutions that rely only on the social science or only on the computer science are doomed to failure. For example, Anonymous developed an approach for identifying members of terror groups such as ISIS on the social media platform Twitter using state-of-the-art computational techniques. These accounts were then suspended. This was a purely technical solution. The result was that those individuals with suspended accounts just moved to new platforms, and resurfaced on Twitter under new IDs. In this case, failure to understand basic social behavior resulted in an ineffective solution.

The goal of the International Conference on Social Computing, Behavioral–Cultural Modeling, and Prediction and Behavior Representation in Modeling and Simulation (SBP-BRiMS) is to build this new community of social cyber scholars by bringing together and fostering interaction between members of the scientific, corporate, government, and military communities interested in understanding, forecasting, and impacting human sociocultural behavior. It is the charge of this community to build this new science, its theories, methods, and its scientific culture in a way that does not give priority to either social science or computer science, and to embrace change as the cornerstone of the community. Despite decades of work in this area, this new scientific field is still in its infancy. To meet this charge, to move this science to the next level, this community must meet the following three challenges: deep understanding, sociocognitive reasoning, and re-usable computational technology. Fortunately, as the papers in this volume illustrate, this community is poised to answer these challenges. But what does meeting these challenges entail?

Deep understanding refers to the ability to make operational decisions and theoretical arguments on the basis of an empirically based deep and broad understanding of the complex sociocultural phenomena of interest. Today, although more data are available digitally than ever before, we are still plagued by anecdotal-based arguments. For example, in social media, despite the wealth of information available, most analysts focus on small samples, which are typically biased and cover only a small time period,

and use that to explain all events and make future predictions. The analyst finds the magic tweet or the unusual tweeter and uses that to prove their point. Tools that can help the analyst to reason using more data or less biased data are not widely used, are often more complex than the average analyst wants to use, or take more time than the analyst wants to spend to generate results. Not only are more scalable technologies needed, but so too is a better understanding of the biases in the data and ways to overcome them, and a cultural change to not accept anecdotes as evidence.

Sociocognitive reasoning refers to the ability of individuals to make sense of the world and to interact with it in terms of groups and not just individuals. Today most social-behavioral models either focus on (1) strong cognitive models of individuals engaged in tasks and thus model a small number of agents with high levels of cognitive accuracy but with little if any social context, or (2) light cognitive models and strong interaction models and thus model massive numbers of agents with high levels of social realism and little cognitive realism. In both cases, as realism is increased in the other dimension the scalability of the models fail, and their predictive accuracy on one of the two dimensions remains low. By contrast, as agent models are built where the agents are not just cognitive but socially cognitive, we find that the scalability increases and the predictive accuracy increases. Not only are agent models with sociocognitive reasoning capabilities needed, but so, too, is a better understanding of how individuals form and use these social cognitions.

More software solutions that support behavioral representation, modeling, data collection, bias identification, analysis, and visualization support human sociocultural behavioral modeling and prediction than ever before. However, this software is generally just piling up in giant black holes on the Web. Part of the problem is the fallacy of open source; the idea that if you merely make code open source others will use it. By contrast, most of the tools and methods available in Git or R are only used by the developer, if that. Reasons for lack of use include lack of documentation, lack of interfaces, lack of interoperability with other tools, difficulty of linking to data, and increased demands on the analyst's time due to a lack of tool-chain and workflow optimization. Part of the problem is the not-invented-here syndrome. For social scientists and computer scientists alike, it is simply more fun to build a quick and dirty tool for your own use than to study and learn tools built by others. And, part of the problem is the insensitivity of people from one scientific or corporate culture toward the reward and demand structures of the other cultures that impact what information can or should be shared and when. A related problem is double standards in sharing where universities are expected to share and companies are not; but increasingly universities are relying on intellectual property as a source of funding just like other companies. While common standards and representations would help, a cultural shift from a focus on sharing to a focus on re-use is as critical for moving this area to the next scientific level.

In this volume, and in all the work presented at the SBP-BRiMS 2016 conference, you will see suggestions of how to address the challenges just described. SBP-BRiMS 2016 continued the scholarly tradition of the past conferences out of which it has emerged like a phoenix: the Social Computing, Behavioral–Cultural Modeling, and Prediction (SBP) Conference and the Behavioral Representation in Modeling and Simulation (BRiMS) Society's conference. A total of 78 documents were submitted as

full papers. Of these, 38 were accepted, for an acceptance rate of 49 %. Additionally there were a large number of papers describing emergent ideas and late-breaking results, or responses to the challenge problem were submitted and accepted. Finally there were nine tutorials covering a diversity of topics. This is an international group with papers submitted by authors from 13 countries.

The conference has a strong multidisciplinary heritage. As the papers in this volume show, people, theories, methods, and data from a wide number of disciplines are represented including computer science, psychology, sociology, communication science, public health, bioinformatics, political science, and organizational science. Numerous types of computational methods are used, including, but not limited to, machine learning, language technology, social network analysis and visualization, agent-based simulation, and statistics. Based on the author's self-selected area for each paper, the breakdown is as follows:

- Behavioral and social sciences: 17 submissions, nine accepted
- Health sciences: eight submissions, three accepted
- Information, systems, and network sciences: 27 submissions, 10 accepted
- Methodology: 12 submissions, eight accepted
- Military and intelligence applications: 14 submissions, eight accepted

This exciting program could not have been put together without the hard work of a number of dedicated and forward-thinking researchers serving as the Organizing Committee, listed on the following pages. Members of the Program Committee and the Scholarship Committee as well as publication, advertising, and local arrangements chairs worked tirelessly to put together this event. They were supported by the government sponsors, the area chairs, and the reviewers. I thank them for their efforts on behalf of the community. In addition, we gratefully acknowledge the support of our sponsors: the Office of Naval Research – N00014-15-1-2463 and N00014-16-1-2274, the National Science Foundation – IIS-1523458, and the Army Research Office – W911NF-14-1-0023. Enjoy the proceedings!

April 2016

Kathleen M. Carley

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